

Midwest Engineer

SERVING THE ENGINEERING PROFESSION



ENGINEERING EDUCATION IN THE U.S.S.R. — PAGE THREE

Vol. 11

DECEMBER, 1958

No. 7

WHEN AMERICA BUILDS FOR ECONOMY . . . IT BUILDS WITH CONCRETE



Sears, Roebuck & Company's Tampa store . . .

**concrete folded plate roof achieves
large, unobstructed floor area**

One of the basic requirements here was to achieve unobstructed floor space with economy. Architects Weed, Russell, Johnson & Associates found the answer by using a concrete shell in the form of a folded plate. This construction made it possible to span the entire floor area with only one interior row of columns . . . and suspend the second floor from the roof. The result: 163,715 square feet of *fully flexible* floor space, so important to any retail selling operation.

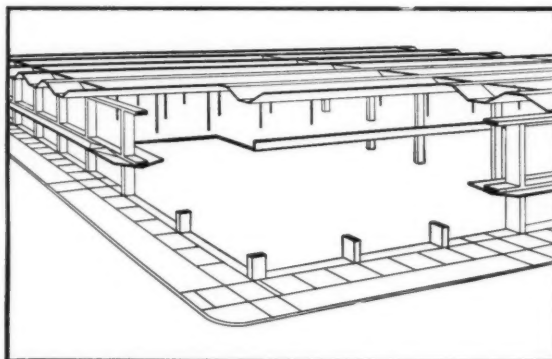
Folded plate design is, in itself, unique and interesting. And only concrete can give the added boldness of the wide, cantilevered overhang.

It's one more example of the way new uses of concrete are bringing big economies and added vitality to both conventional and modern architecture.

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FOR STRUCTURES...

MODERN

concrete

Isometric view showing 125-foot c on c spacing of main columns. Floor slab is supported by 3-inch plates welded together to form a hanger. Hangers are spaced 25 feet c on c.

—United Press Photo

Around The World

LADIES' NIGHT

HIGHLIGHTS OF THE

BACON FILM

Native hukilau and luau in Hawaii; a hula show; surf board riding through a telephoto lens; spectacular eruption of Mona Loa; Boys Festival in Tokyo; How pearls are grown by Miki-moto at Ago Bay; Magnificent Mount Fuji and the Fujiya Gardens; Festival at Nikko; Japanese Sumo wrestling; Flight over the North Pole; See the spot where Perry stood; Smorrebrod in Copenhagen; Hobnobbing with the Vikings; Norway's Hardangerfjord; Sweden above the Arctic Circle; Golf at midnight; Lapland; Fun with the Finns; Thumbnail of Russia including Miss Voluptuous of 1958 at Sochi; through the Bosphorous to Istanbul; Antiquities of Greece; Brussels World Fair.

... the gala kick-off of Western Society's 90th Anniversary Year.

THURSDAY — FEBRUARY 5

5:00 P.M. — SOCIAL HOUR AND INTERNATIONAL BAZAAR

Your evening in far away places begins as you step off the WSE elevator. Through the cooperation of United Air Lines, Japan Air Lines, Scandinavian Airways System, and Sabena Belgian World Air Lines you will find yourself in an atmosphere of world wide charm. Savor the flavor of many cultures blending while you enjoy your refreshments before you move to the International Bazaar.

Here all kinds of international items donated by members, good friends of WSE and our sponsoring airlines will be sold at a silent auction. If you attended the "NIGHT IN PARIS" Flea Market last year, you will remember the fun we had.

Refreshments, including hors d'oeuvres will also be served in the International Bazaar as well as the 6th floor Lounge.

7:00 P.M. — AROUND-THE-WORLD DINNER AND INTERNATIONAL FLOOR SHOW in the 5th floor Lounge.

The hors d'oeuvres served you during the Social Hour will tease your palate. The Around-The-World Dinner taking you on a gourmet's tour of Hawaii, Japan, Scandinavian countries, Russia, Turkey, Greece, and Belgium will satisfy it.

The International Floor Show will delight, charm and entertain you.

8:30 P.M. — INTERNATIONAL BAZAAR WILL RE-OPEN with final bids and payment of all purchases

9:00 P.M. — AROUND THE WORLD WITH THE BACONS — Auditorium 7th Floor

The men at the Kick-Off Dinner who saw Bob Bacon's "Impressions of Russia" are still talking about his wonderfully unique color movies.

For this Around-The-World showing, Bob has taken just the highlights from 12,000 feet of film and condensed 7 hours into a one-hour showing—which he rather modestly says is on a par with the best Hollywood has to offer.

In addition to the countries previously listed, you will also have a thumbnail view of Russia NOT PREVIOUSLY shown—but it will take you to all spots covered in his "Impressions of Russia" including shots on the beaches of Sochi.

You can enjoy all the fun of the "Around-The-World" party for only
\$6.50 per person.

PLEASE HELP US OUT BY SENDING YOUR RESERVATIONS AND CHECK
IMMEDIATELY SO WE CAN COMPLETE ARRANGEMENTS.

Western Society of Engineers

84 East Randolph Street, Chicago 1, Illinois

RAndolph 6-1736

A report—

Engineering Education in the U.S.S.R.

Engineering education of sound quality is effectively integrated into the planned economy of the U.S.S.R.

This was one of the major observations of the eight-man mission of U.S. engineering educators who returned the week of December 11 from three weeks of study and inspection in the U.S.S.R.

Among their observations, members of the mission called attention to the dynamic character of Russian engineering education, the continuous process of re-evaluation affecting it, and the ability of this controlled system to adjust to the inevitable variations in personal capabilities at both the student and faculty level.

The mission was sponsored by the American Society for Engineering Education and the National Science Foundation with the cooperation of Engineers Council for Professional Development. Its chairman was Dr. Frederick C. Lindvall, chairman of the Division of Engineering at California Institute of Technology; Professor Newman A. Hall, head of the Department of Mechanical Engineering at Yale University, was secretary.

Other members were:

William T. Alexander, dean of Engineering at Northeastern University, Boston, president of the American Society for Engineering Education.

Dr. William L. Everitt, MWSE, dean of Engineering at the University of Illinois, president of Engineers Council for Professional Development.

Professor Ralph E. Fadum, head of the Department of Civil Engineering at North Carolina State College.

Dr. Albert G. Guy, professor of metallurgical engineering at Purdue University.

Dr. Ralph A. Morgen, director of the Purdue Research Foundation.

Dr. Leon Trilling, associate professor of aeronautical engineering at the Massachusetts Institute of Technology.

This mission was initiated by the Department of State under an agreement with the U.S.S.R. for the exchange of scientific and cultural delegations. A comparable Soviet educational mission is expected to visit the United States in February, 1959.

Members of the U.S. delegation visited 25 teaching and research institutions in Moscow, Leningrad, Kuibyshev and Frunze. The last is the capital of the Kirgiz Soviet Socialist Republic, situated on the border of China some 2100 miles southeast of Moscow. This city was of particular interest because its engineering school is new, growing rapidly, and planned to meet the particular needs of an expanding industrial and agricultural economy.

* * *

Following is the text of the preliminary report of members of the mission.

The whole economy of the U.S.S.R. is integrated into a broad plan administered by an agency known as GOSPLAN. The formulation of the portion of the master plan related to engineering education is the responsibility of the Ministry of Higher Education.

A long-range plan covering a period normally of five years (currently seven years) is formulated first. Each year this master plan is modified to take into account the accomplishments actually achieved in the previous year. The plan considers the needs of the whole Soviet Union in the light of:

a. the expansion of industrial plant capacity,

b. the need for replacements,

c. the replacement by professional people of non-professional personnel not adequately trained.

The seven-year plan now being formulated contemplates that an average of 350,000 graduates in all professional fields (engineering, science, medicine, languages, etc.) will complete their training each year. This is an increase of 40 per cent over the average of the past seven years, but in engineering it is proposed that the increase shall be 90 per cent.

The master plans specifies:

a. the number who may enter the institutions of higher education,

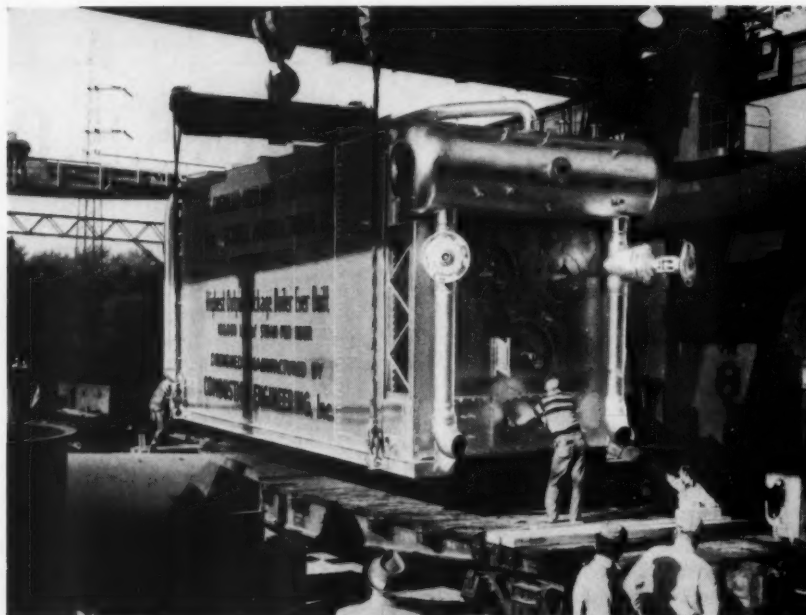
b. the number who may train for each field of specialization,

c. the quota of each specific institution for each specialty,

d. the jobs which will be available at the time of graduation.

Such planning demands that each student (at present upon graduation from the ten year school at the age of 17 or 18) must choose irrevocably a narrow field of specialization when he applies for admission to college. Alternatively, he may postpone this decision by temporarily entering industry; under changes now contemplated, this period of industrial experience may become obligatory. The rules allow the student to apply for only one field of specialization in one institute in a given year. Furthermore, he commits himself to work in the particular phase of industry for which the course is designed. If he fails to secure admission in a severe competition (but one which varies in its severity with the field and institution), he may not apply for higher education for another year.

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with these advantages

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While the student makes a commitment as to his field, the goals and objectives of the plan may be changed by the State from time to time. Thus, specific curricula at certain schools may be eliminated. The students then enrolled in such curricula will be shifted to a similar specialty in which additional manpower is needed. They may, however, be allowed additional time, up to six months, to adjust to the change.

As indicated above, changes in the program are now under consideration. These include:

- a. revision of the amount of industrial practice required,
- b. broadening of the base of some curricula,
- c. changing the number of students in specialties to fit the revised industrial program.

It is understood that the secondary school program is also undergoing critical analysis with a view to making extensive changes, but the delegation did not have the time or opportunity to study this.

Since Soviet engineering education is planned to fulfill the specific needs of the state, it is tailored in considerable detail to the jobs to which the young engineer will go upon graduation. The curricula are narrowly specialized in their objectives and prepare the students to be immediately useful to industry with a minimum of additional training. This results in dividing engineering into some 160 separate specialties such as mechanical engineer-automobile designer or mechanical engineer-automobile maintenance. This contrasts sharply with less than 20 fields accredited in the U.S., of which the great majority of students are included in about five fields.

The duration of the full-time day program is 5 or 5½ years. The first two years are broadly based on mathematics and science. But from the day of his matriculation the student pursues a specialty. For the most part he meets, in lectures or laboratories, only with other students taking the same program. The illustrations in mathematics, physics, chemistry, mechanics, etc., are selected to emphasize their application to his field.

The last three years consist of increasingly specific courses, often built around design projects, industrial practice, and an elaborate diploma project requiring one semester of full-time work.

By 1960, many automobile dashboards will be bulbless; they will be lit by a soft green glow, forecasts "Electronics." A sheet of material, placed behind the dashboard, will draw power from the car's generator and give off a soft green light, illuminating the instrument panels.

These projects involve extensive detailed drawing and are intended to acquaint the student both with principles and prevailing practice in his specialty.

The young Soviet engineers are well grounded, and their best men are as good as any in the world. However, it appears to the delegation that many must be limited in their outlook by knowing little engineering outside their own narrow field.

* * *

Nowhere is the engineer and scientist held in higher regard than in the U.S.S.R. Engineering students and practicing engineers are exempt from military service. Indeed, engineers and sci-

entists are among the aristocracy of Soviet society. There is, therefore, strong motivation and social pressure to aspire to such careers.

An engineering education opens the door to positions of high rank. On the other hand, to achieve such positions without some type of diploma would appear virtually impossible. In general, the limit of achievement of the non-graduate in an industrial enterprise is the position of foreman, while this is considered the minimum position for a graduate.

A motivation factor not to be underestimated is the strong devotion to a system that greatly encourages education. Those who qualify for admission to an institution of higher learning need not be concerned because of a lack of financial resources. Grants are provided by the state in sufficient amount to care for basic needs.

A system that offers such unique advantages to the educated instills a strong desire for higher education in the youth of both sexes. Currently about one-third of the total enrollment in the schools of engineering technology is comprised of girls. Competition for admission is keen. The planned economy provides one opportunity for every three to nine applicants, depending on the prestige of the institution and the importance attached to the specialty. Since

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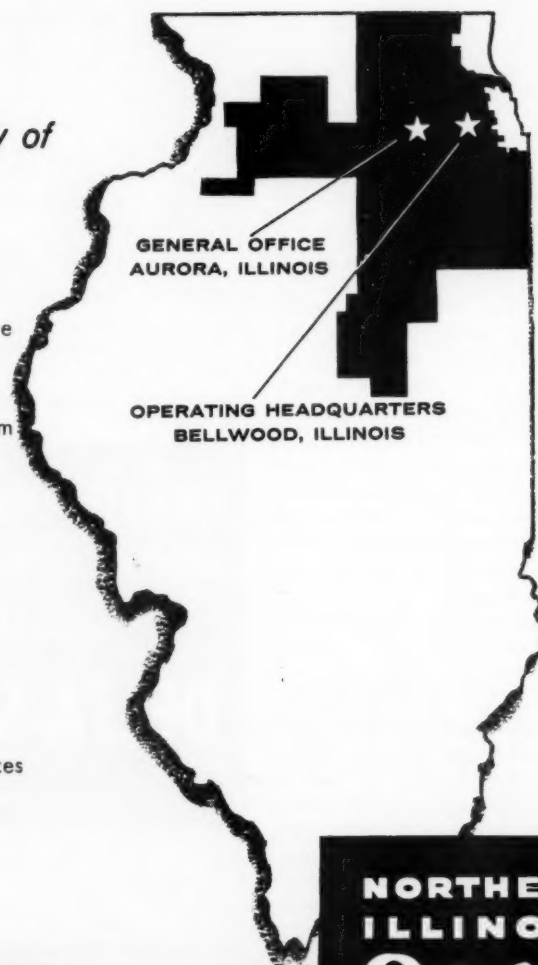
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students may make only one application for admission in a given year, the less able are motivated to apply for admission to a specialty in which there is a minimum of competition rather than to the specialty of their first choice.

As a result of these factors, a seriousness of purpose pervades the classroom and laboratory. This is clearly evident to the most casual observer. The students themselves have a genuine respect for intellectual achievement and disdain for the laggard. For example, we saw cartoons on bulletin boards drawn by students to scold those who do poorly in their work. We also saw a statue of a student studying his lesson on the way to class and were told that poor students are hazed by their fellows before this symbol. In this atmosphere, approximately 90 per cent of those who gain admission to the day schools complete diploma requirements and 50 per cent of those in evening and correspondence programs graduate.

We also observed that the educational system is able to adapt itself not only to changing industrial needs but also to the wide ranges in human interest and ability. The system recognizes the tendency of the most able people in intellectual fields to make their best contributions when associated with others of comparable attainment and in an environment quite largely of their own choosing. It was observed that able people in the U.S.S.R. prefer to work in the larger cities and the older institutions, where cultural and intellectual activities are most widely available. Hence, the strongest faculties were found to be associated with educational institutions in these centers. While the detailed program for a given specialization is the same for a large number of institutions offering that specialization, the Ministry of Higher Education recognizes that the level at which these topics will be taught must depend upon the background and ability of the professors.

* * *

Some fourteen outstanding institutions offer more advanced and individualized curricula. These institutions are given greater freedom in changing their curricula from the prescribed pattern. Modifications of appreciable magnitude are usually approved by the Ministry with little delay. These institutions, as well as the stronger industrial groups and research institutes, are expected to

provide leadership in changing programs to meet new scientific and engineering developments. It also appears that competition to enter these institutions is keener and that they attract the most able students from all over the Soviet Union.

For several years there has been much expressed difference of opinion in the U.S. concerning the quality of technological education in the U.S.S.R. This mission has had the opportunity to observe classes in operation, to talk with teachers and to examine curricula. It is clearly evident that thorough, scientifically based programs of study are in operation.

Laboratory equipment is of good quality and in ample supply but varies appreciably between institutions. In addition, considerable imagination has been used in developing equipment to demonstrate basic principles. Textbooks appear to be in ample supply and carefully prepared. They are encyclopedic in nature and include much practical information in addition to the theory. Furthermore, an extensive background in mathematics is required to follow accurately much of the text material. It appears that the entering student knows as much mathematics and somewhat more physics and chemistry than college freshmen entering the better engineering schools in the U.S.A. The Soviet 5- and 5½-year curricula afford time to give

a good theoretical background in addition to much practice with problems specifically related to the student's specialty. However, the members of the Mission agree that engineering education in the U.S.S.R. cannot be compared realistically with that in the United States because it is tailored to quite a different system.

* * *

The delegation was accorded every courtesy by the Ministry of Higher Education and by the faculties of the institutions that were visited. Competent interpreters were made available, who also became friends we would like to see again. Transportation facilities were on hand whenever needed—from Leningrad to Frunze, a range of 2,500 miles.

A genuine spirit of friendliness prevailed in the discussions of educational matters, which were free and uninhibited. Much interest in developments in U.S. education was manifested and a strong desire was indicated for participation in exchange missions to the U.S. We look forward with pleasure to the visit of the U.S.S.R. delegation.

Big Buyers

Young drivers mean big business for service stations, declares *National Petroleum News*. Teen-agers buy 2.5 billion gallons of gasoline a year.

Dates of Noon Luncheon Meetings

February 4

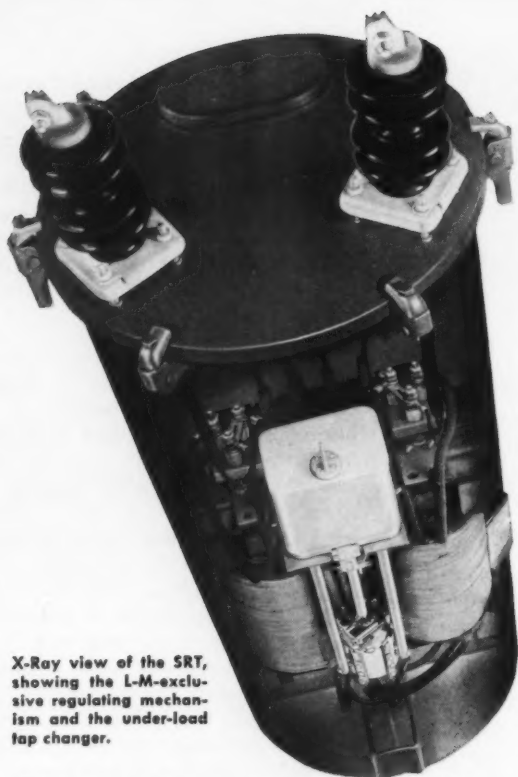
February 18

February 11

February 25

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Western Society of Engineers Presents Around the World Ladies' Night

Date: February 5. See Page 2 For Details

IIT Gets New Computing System

A new electronic computing system, the Univac 1105, will be installed on the campus of the Illinois Institute of Technology next spring.

Chicago gains one of the nation's most advanced computing and data processing facilities by this expansion of Technology Center's problem-solving capabilities, according to Dr. John T. Rettaliata, MWSE, IIT president.

The model 1105 computer, a Remington Rand product, is the first designed to handle efficiently all digital computer applications encountered in business and science, said Harold H. Kanter, supervisor of mathematical services at IIT's Armour Research Foundation, which will operate the Univac 1105.

Developed from Remington Rand's 1103-A, the new model has outstanding capabilities for the solution of scientific, engineering, and management problems. Additionally, its design makes it exceptionally well-suited for the data processing tasks of commerce and industry, Kanter said.

Explaining the planned utilization of the giant computer, Kanter indicated that the primary uses of the Univac 1105 will relate to the Institute's educational and research activities, the Foundation's industrial and governmental research projects, and a continuing program of assistance to the U.S. Department of Commerce, Bureau of the Census, for the processing of data such as that to be obtained in the 1960 Census.

The census work will be part of an over-all plan whereby anticipated peak workloads can be accommodated on compatible computer installations committed to this purpose in advance.

Acquisition of the combined scientific-business computer and its planned utilization for substantial data processing as well as engineering and scientific applications emphasizes the growing interdependence of commerce and scientific research and the increasing influence of mathematical methods. The Foundation's unified facility for research and services in the sciences of mathematics and statistics, operations research, systems engineering, and automatic computation has developed rapidly since the operation of its first electronic computer in 1950.

Nickel Now Serves In Yet Another Role

Nickel, which is used in making over 3,000 alloys, is now serving industry in yet another role. This versatile metal, it has recently been found, contributes color stability to yellow paint pigments.

The problem of developing a yellow paint that would retain its yellowness through years of outdoor exposure had long perplexed the paint industry. Of all paints, yellow was especially susceptible to the ravages of sunlight, heat, moisture and corrosive atmospheres.

But now there's no longer need to "wonder where the yellow went." Two new nickel-containing pigments, Sun Yellow N and Sun Yellow C, have been developed to make yellow paints that retain their color even in temperatures of over 1,000-degrees F. Combining outstanding light fastness with alkali and heat-resistance, they are also impervious to acids. The Sun Yellows are used in outdoor and masonry paints, as well as in automotive and industrial finishes where a permanent yellow color is desired.

Produced and marketed by The Harshaw Chemical Company, Cleveland, Ohio, the Sun Yellows are direct descendants of titanium dioxide pigments with locked-in chemical colors developed by the du Pont Company shortly after World War II. Preceding this develop-

ment, titanium dioxide had become the most widely used white pigment on the market due to its high hiding properties.

Combinations of metallic oxides and titanium dioxide were found to produce color-tinted varieties of this popular pigment. The specific combination of nickel oxide and titanium dioxide yields a light yellow pigment. Besides imparting the yellow color, nickel, which is present to the extent of about three per cent, contributes to the pigment's high durability and chemical resistant qualities.

Pigment separation, with a resultant uneven change of color, is a common problem where tints are made by mixing a white titanium dioxide pigment with a colored pigment. But with the Sun Yellows, pigment separation is impossible because each pigment particle is yellow; the yellow is locked into the paint.

The largest market for the new nickel-base pigments is in house paints and masonry finishes. Their durability is attested to by the fact that manufacturers of cement asbestos house shingles, intent on getting a color that will last as long as the 20-year-guaranteed shingles, almost invariably specify the nickel-titanium dioxide pigments, according to Harshaw Chemical. They are also widely used to give aluminum sidings much-needed protection against sun, salt air, acids and other corrosive elements, as well as in finishes for automobiles and household appliances.

WSE Nominating Comm. Appointed

To the Corporate Members:

I am pleased to announce that in accordance with Article X, Section 3, of the Constitution, the Board of Direction has appointed a Nominating Committee as follows:

W. M. Ballenger
A. P. Boysen
J. P. Ganedinger
W. W. Pomerhn
H. P. Sedwick
F. V. Smith
A. L. Tholin

The Constitution also provides that suggestions for nominees shall be solicited in the publications of the Society.

J. EARL HARRINGTON
Executive Secretary

Tear off and Return

To the Nominating Committee:
Western Society of Engineers:

I suggest the following names for consideration by your committee for offices indicated.

Officers and Trustees

President
1st Vice Pres.
2nd Vice Pres.
Treasurer
Trustee (eight to be nominated)
1.
2.
3.
4.
5.
6.
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8.

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Compounds Remove Plutonium

Two compounds that grasp metal atoms in octopus-like molecular tentacles have proved effective in flushing out radioactive plutonium from the bodies of laboratory experimental animals — even when treatment is delayed for several days.

Scientists from the Argonne National Laboratory Division of Biological and Medical Research, one of a number of research groups studying these compounds, made this announcement Dec. 16. Their treatment has so far been used successfully to remove plutonium from the bodies of rats.

Dr. Jack Schubert, a senior chemist at Argonne, reported that his laboratory research team has had success with two metal-grasping substances known as DTPA and BAETA which possess an extraordinary number of tentacles, so arranged that the plutonium atom is imprisoned in a molecular cage from which escape is nearly impossible.

These compounds are known as chelating agents, substances that sequester or trap metal ions to form a stable, water soluble complex that is relatively chemically inert. The complex is naturally flushed out of the body by normal elimination processes. DTPA and BAETA are not poisonous to man.

DTPA and BAETA, which have mile-long chemical names, DTPA = diethylenetriaminepentaacetic acid; BAETA = 2:2'-bis [di(carboxymethyl) amino] diethyl ether) are already familiar research tools to the chemist. They belong to a class of specially designed compounds called polyamino acids used for water softening, to remove metal stains from fabrics, to carry trace minerals in agriculture, and to help in the manufacture of synthetic rubber.

Now, with Mrs. Joan F. Fried, assistant biologist, William M. Westfall, technical assistant, and Prof. Emil Heinz Graul, Dr. Schubert has found that DTPA and BAETA can remove large fractions of plutonium even when treatment is delayed for as much as a week.

Similar findings with DTPA and animals have been reported by V. H. Smith of the Biology Operation, Hanford Laboratories, Richland, Washington. Use of DTPA to remove cerium (another heavy metal) was reported in 1957 by Dr. Alexander Catsch of the Institute of Radiation Biology at the Reactor Station,

Karlsruhe, Germany. The Argonne work is the first reported use of BAETA to remove plutonium.

Several groups of scientists are now studying ways of removing plutonium and other heavy metals from the body. Some substances — notably zirconium citrate and EDTA (ethylenediaminetetraacetic acid)—have proved effective in removing plutonium, providing treatment is delayed no longer than eight hours after exposure.

"Until recently," Dr. Schubert said, "we have had little success in removing appreciable amounts of plutonium which have been retained in tissues for several days."

In a few cases DTPA, as well as zirconium citrate and EDTA, have been given to humans exposed to plutonium, Dr. Schubert reported. Though not enough data have been accumulated to make the work with humans and DTPA statistically significant, he said, there should be no difficulty in extrapolating the results of experiments with animals.

In one experiment at Argonne, rats were given a single injection of DTPA or BAETA six days after exposure to plutonium. Within 24 hours the rats excreted more than 5 percent of the plutonium retained in their bodies. This is about 150 times as much as they would have eliminated without treatment.

Dr. Schubert said, "It now appears that repeated treatment with DTPA or BAETA for an extended period can remove most of the plutonium deposited in the bodies of animals and man."

He added, "However, no effect on the elimination of the fallout radioactive isotope strontium-90 can be expected with DTPA and BAETA, and none has been found."

The American nuclear industry takes elaborate precautions to avoid exposure of humans to radioactivity from plutonium. This element and its compounds are handled by the use of rubber gloves behind air-tight shielding, often in an inert atmosphere where there is no oxygen present.

Plutonium is a man-made chemical element not occurring in nature. It is highly radioactive and readily undergoes the nuclear fission chain reaction. Though heretofore used mostly in atomic weapons, plutonium is finding peaceful uses as a fuel for power-producing nuclear reactors.

Plutonium can be "bred," or manufactured, from non-radioactive and non-fissionable uranium-238 by bombarding this substance with fast neutrons. In this way it will be manufactured in Argonne's Experimental Breeder Reactor II now under construction at the National Reactor Testing Station near Idaho Falls, Idaho.

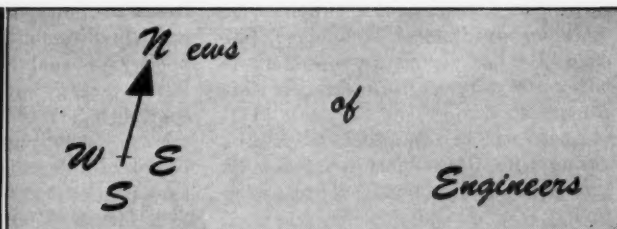
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The appointment of **Theodore G. Nichols**, MWSE, to the position of superintendent of plant facilities of research services has been announced by Armour Research Foundation of Illinois Institute of Technology.

Before joining the Foundation in 1956, Nichols was associated with Paschen Contractors as assistant superintendent.

* * *

Among new instructors named to the faculty of Illinois Institute of Technology are: Joseph G. Krofta, architecture, and James E. Stice and Marshall Wernick, both chemical engineering.

Krofta, a licensed architect, has been an architectural designer for Sumner Sollitt Co. and a draftsman for Mittelbush and Tourtelot, Keck and Keck, Alfred Caldwell, L. F. Coleman, and Maramore, Bain, Brady & Johanson.

He received his bachelor's degree in architecture and his master's degree in city and regional planning at IIT, where he organized the student chapter of the American Institute of Architects and was 1955 recipient of the Alpha Rho Chi architectural fraternity award. He also attended Catholic University of America and the University of Wisconsin. He, his wife, and two children live in Beverly Shores, Ind.

Stice, formerly an assistant professor at the University of Arkansas, also has been a chemical engineer for Humble Oil and Refining Co., E. I. DuPont de Nemours, and Universal Oil Products Co., and a process engineer for Grace Chemical Co. and the Visking Corp.

He is a graduate of the University of Arkansas, where he was a distinguished military graduate and outstanding senior in the College of Engineering. He received his master's degree and currently is working toward a Ph.D. degree at Illinois Tech. His fields of advanced study include applied mathematics and physics.

Wernick cooperated with the late Vasili I. Komarewsky on a paper,

"Catalytic Properties of Rare Earths," which was presented at the 16th International Congress of Pure and Applied Chemistry in Paris, France.

* * *

Illinois Bell Telephone Co., Engineering Department - Chicago Area announces that effective January 1, P. G. Eckert, division engineering manager (North) is transferred to the General Operations Engineering Department and **T. D. Hartsell**, MWSE, district engineering manager (West) is appointed division engineering manager (North).

* * *

One of the top honors in the chemical engineering profession, the William H. Walker Award, has been won by Dr. Robert L. Pigford, of the University of Delaware, it has been announced.

Dr. Pigford, who is department head and professor of chemical engineering at Delaware, won the award in recognition of distinguished contributions to chemical engineering literature, especially for his publications on rate

processes, according to F. J. Van Antwerpen, secretary of the American Institute of Chemical Engineers, which conferred the honor on Dr. Pigford.

Dr. Pigford is the 20th recipient of the Award, which was presented to him at the 51st Annual Meeting of the Institute in Cincinnati on Dec. 8. The Award is given annually to "encourage excellence in contributions to chemical engineering literature."

Dr. Pigford, a native of Meridian, Miss., and holder of degrees from Mississippi State College and the University of Illinois, has a master's degree and a doctorate from the latter institution. He was a chemical engineer with E. I. Du Pont de Nemours & Co., before assuming his teaching post with the University of Delaware in 1947.

He is a co-author of two books on chemical engineering and is a contributor to the *Chemical Engineering Handbook*. He also has authored articles on applied mathematics and unit operations in numerous publications. He is an industrial consultant on unit operations and thermodynamic problems.

* * *

The appointment of Glenn C. Melby to the position of manager, Materialite Architectural Department, has been announced by the Material Service Corporation.

A civil engineer, Melby has been a designer of many major reinforced con-

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crete structures, notably cement and steel plants and hydro-electric installations. He has also served as design project engineer on work in the United States, India, and South America.

Melby served as a Naval officer in charge of construction work on Okinawa during World War II. A native Chicagoan, he resides in Lake Villa, Illinois, with his wife and four children.

According to Allan Douglass, Material Service vice-president, Mr. Melby will be working with Midwestern architects and engineers in connection with the use of Materialite, a new lightweight aggregate.

* * *

Dr. Lauchlin M. Currie has been elected a vice president of The Babcock & Wilcox Company and placed in charge of the Atomic Energy division, it was announced in New York on Dec. 14 by M. Nielsen, president.

To accept the new B&W post, Dr. Currie retired as a vice president of Union Carbide Nuclear Company, a division of Union Carbide Corporation.

* * *

The appointments of R. C. Hartman and R. W. Miltz as sales managers for its Philadelphia and New York Sales Districts respectively, have been announced by Bestwall Certain-teed Sales Corporation.

Hartman was Chicago District Sales Supervisor. He formerly had served for several years as sales representative in the Rochester, New York, territory of the firm's Buffalo District.

Miltz enters his new post as New York District Sales Manager with more than five years' service as a salesman in the firm's Cleveland territory. More recently he was Cleveland District Roofing Supervisor.

Bestwall Certain-teed is sales organization for Bestwall Gypsum Company and Certain-teed Products Corporation, building products manufacturers of Ardmore, Penn.

* * *

Appointment of **John J. Ahern**, MWSE, to the newly-created position of director of security for General Motors was announced on Dec. 8 by Louis G. Seaton, GM vice president in charge of Personnel Staff.

Since 1945 Mr. Ahern has been professor and director of the Department of

Fire Protection and Safety Engineering at Illinois Institute of Technology, Chicago. He has served as consultant to General Motors on fire protection since August, 1953.

Ahern will be responsible for coordinating with GM divisions practices in safety, plant protection and fire protection.

The appointment is effective January 1. Following graduation from Illinois Institute of Technology with a degree in fire protection engineering in 1935, Mr. Ahern worked as a special agent for an insurance company for several years before joining the U. S. Ordnance Department in 1942, for which he conducted war training programs in explosives and industrial safety.

Ahern is a member of the Civil Service Commission in Chicago, and past president of the Greater Chicago Safety Council. He served as the first president of the Society of Fire Protection Engineers.

He was secretary of the President's Conference on Fire Prevention in 1947 and has acted as consultant for major insurance, industrial and utility companies, as well as the Chicago Fire Department.

* * *

Dr. Frank E. Myers, associate director of the Argonne National Laboratory, Lemont, Ill., has been elected to the committee which administers the ASTE

Research Fund, a separately incorporated fund established by the American Society of Tool Engineers in 1952 to foster research in the broad field of tool engineering. Dr. Myers was elected to this permanent position by the Society's Board of Directors at its recent semi-annual meeting.

A former dean of graduate studies at Lehigh University, and the war-time assistant head of the Physics Division at Frankford Arsenal Ordnance Laboratory, Dr. Myers will provide the committee with a background of authoritative experience in atomic energy matters and in national education in physics.

During World War II, he received the Civilian Award for Meritorious Service for his contribution to ballistic studies at Frankford Arsenal, which led to the development of new and improved types of ammunition and weapons.

James R. Weaver, manager of Manufacturing and Engineering at the Westinghouse Springfield plant, and a past-president of ASTE, was re-elected Chairman of the Society's Research Fund Committee.

* * *

Theodore W. Van Zelst, member of WSE, was recently named one of the Ten Outstanding Young Men in the Chicagoland area by the Chicago Junior Chamber of Commerce. The ten were selected for their contributions to their

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professions and the general welfare of the people.

Van Zelst is President of Soiltest, Inc., manufacturer of engineering test apparatus for soils, concrete and asphalt. His business has grown from an idea in 1946 to the present company which is the largest of its kind in the world. Testing equipment manufactured by Soiltest is used by over 4000 laboratories in 105 countries. Van Zelst has lectured extensively abroad and is the publisher of an engineering newsletter, "The Testing World," with an international circulation of 75,000 copies.

* * *

Eugene Moriarty, former senior sales engineer for The Lummus Company, New York, N. Y., has been named chemical projects engineer at Vitro Engineering Company, a division of Vitro Corporation of America.

He will specialize in chemical process sales.

A graduate of Northwestern University with a bachelor of science degree in chemical engineering, 1947, Moriarty served as assistant plant engineer for G. D. Searle & Company from 1948 to 1953. From 1953 to 1958 he was employed by The Lummus Company in both their New York and Chicago offices.

Moriarty is a member of the American Institute of Chemical Engineers, the American Chemical Society, and the Chemists Club of New York.

* * *

The appointment of Hugh D. Barnes to the new position of supervisor of Field Promotion for the Portland Cement Association has been announced by G. Donald Kennedy, Association President.

Barnes, who has served as manager of the Western Regional Office in Los Angeles since 1956, assumed his new duties in the PCA General Office Headquarters, Chicago, on Nov. 1. In this senior management position he will direct and have complete authority and responsibility for all operations of the Association's 32 district and 6 regional offices.

John M. McNerney, district engineer for the Association's Los Angeles Office, will succeed Barnes as Western Regional Manager. He will hold both posts until a new District Engineer is designated.

In announcing the appointments, Mr. Kennedy stated that the new position was

created as a result of the Association's increased field activities, and to provide more active personal supervision of regional and district office operations. Mr. Barnes will report direct to James D. Piper, the Association's Vice-President for Promotion.

Barnes joined the Association in 1937 as a regional highway engineer for the Pacific Coast area. He was appointed acting district engineer of the Los Angeles Office in 1941, district engineer in 1942 and western regional manager in 1956. Prior to joining PCA, he served with the Kansas Highway Commission for 15 years.

A registered professional engineer in California, Mr. Barnes holds both a bachelor's degree and a professional degree in Civil Engineering from Kansas State College. He is a member of the American Society of Civil Engineers and the Society of American Military Engineers, an associate member of the Highway Research Board and the Structural Engineers' Society of Southern California, and a member of the Board of Directors of the Los Angeles Traffic Association.

McNerney joined the Portland Cement Association in 1941 as a soil-cement field engineer. He served as statewide paving engineer and as field engineer supervisor for the Los Angeles District Office prior to his appointment as District En-

gineer in August, 1956. Before joining PCA, he served for 11 years with the Missouri State Highway Department.

A graduate in Geology from the University of Missouri, McNerney is a registered professional engineer in that state. He is an Associate Member of the American Society of Civil Engineers and the Highway Research Board, and a member of the American Concrete Institute, the American Society for Testing Materials, the American Public Works Association, and the National Reclamation Association.

* * *

George C. Elmberger has been appointed director of Industrial Engineering at National Can Corporation, Wesley H. Douglass, vice-president has announced.

Elmberger, most recently coordinator of wages and salaries, will exercise functional control over the corporate Industrial Engineering Department, engineers in their divisions reporting directly to their division managers. The appointment is the most recent of a series of steps in National Can's program to delegate responsibility to the operating level.

Elmberger, 46, attended John Marshall Law School, and was graduated from Northwestern University in 1957 with a major in production management. He was an industrial engineer with Sun Electric Corporation, Chicago, and

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served in various supervisory industrial engineering capacities with other can manufacturers before joining National Can to head wage and salary administration two years ago.

The Elmborgers live at 342 Highland Avenue, Elmhurst, Ill.

He is succeeded by Caesar Boone, who has been transferred from the Atlantic Division Industrial Relations Office, where he was a job analyst. Both Boone and Elmborgers will headquarter in the Executive Offices, Chicago.

Boone, 46, is a graduate of the University of North Carolina and of The Johns Hopkins University. Boone has 15 years experience in wage and salary analysis and job description. Before joining National Can three years ago, he was a job analyst with Koppers Company, Metals Products Division, Eastern Stainless Steel, and the federal government. He served five years in the Army Air Corps during World War II in the job analysis field.

With 17 plants coast to coast, National is one of the three major can manufacturers.

* * *

Cris Dobbins, president of the Ideal Cement Co., Denver, has been elected chairman of the board of directors of the Portland Cement Association at its annual meeting in Chicago.

Dobbins who has served on the board of directors, and as a member of various committees since 1948, succeeds George E. Warren, president of Southwestern Portland Cement Co., Los Angeles, chairman of the board of the association during the past two years.

Nine new directors were also elected by Association members at their annual meeting.

The Portland Cement Association, a national organization to improve and extend the uses of portland cement and concrete, is voluntarily supported by more than 70 companies manufacturing portland cement in the United States and Canada. Its activities are limited to scientific research, development of new or improved products and methods, technical service, promotion and educational effort, and safety work.

Mr. Dobbins, new chairman of the Board of the Association, has been president of the Ideal Cement Co. since 1952. He joined that firm in 1919. Dobbins is chairman of the American Crystal Sugar

Co., and a director of the Denver National Bank, the Potash Co. of America, and the C.&S. Railway Co. He is a trustee of the Portland (Colorado) Hospital Association, the University of Denver, the Denver Museum of Natural History, and vice-chairman of the Boettcher Foundation. Mr. Dobbins is a life member of Alpha Kappa Psi. His home is in Denver, Colo.

* * *

Retirement of Walter E. Jessup as editor of *Civil Engineering*, official publication of the American Society of Civil Engineers, has been announced by William H. Wisely, Executive Secretary. The retirement is effective December 1.

At the same time, Mr. Wisely announced that Hal W. Hunt would succeed Mr. Jessup as editor of the magazine, the circulation of which consists mainly of the 42,000 members of the 106-year-old engineering Society. Hunt has been executive editor since March, 1957.

Mr. Jessup's service with the Society covers a span of 28 years. He was the first editor of *Civil Engineering* when it was established in 1930, serving in that capacity until 1935, when he became field secretary for the society. He held this post until 1942, when he entered the Army as a Lieutenant Colonel attached to the Office of Engineers in Washington, D.C. After the war, he acted as Western Representative of ASCE, and in 1948 again became editor of the magazine.

On retirement, Mr. Jessup returns to California, his native state, where he will reside in San Marino and resume the practice of civil engineering, which he interrupted when he joined the society staff in 1930. He was graduated from

the University of Southern California in 1910 with a degree of bachelor of arts, and from the University of Wisconsin in 1912 with a degree in civil engineering.

Hunt, a civil engineering graduate of the University of Iowa, served for eight years as an associate editor of *Engineering News-Record*, writing in the construction, business and labor relations fields. He has had a wide variety of construction experience with contractors and engineers, in both field and office. Immediately prior to joining *Civil Engineering*, he served for two and one-half years in Spain, first as project engineer on the design of the \$70,000,000 naval port and airport development on Cadiz Bay, and then as chief engineer for the construction of the \$20,000,000 harbor at Rota.

German Gremlins

Gremlins are not new. Early German prospectors met them first, when they discovered nickel, reports *American Machinist*. Since the nickel looked so much like copper when it was in ore form, miners believed it actually was copper. When it didn't react like copper in smelting, it was reasoned that a gremlin or "Nicholas," trapped inside, was being deliberately mischievous.

Information Machine

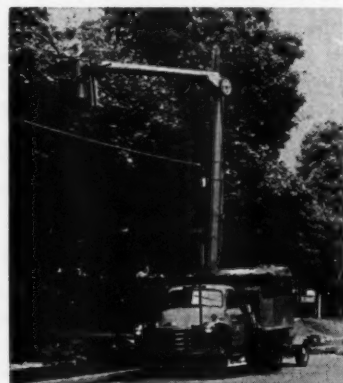
Russian scientists are working on a universal information machine which they say would store technical information and make reference books obsolete, reports *Product Engineering*. The machine will store blocks of paper sheets with information recorded on them in code.

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Reviews of Technical Books



Cast Iron

Gray Iron Castings Handbook, edited by Chas. F. Walton, Gray Iron Founders Society, Inc., Cleveland, Ohio. Pages, 607. Price, \$10.00.

The Gray Iron Casting Handbook is the result of the cooperative effort of a number of research organizations and metallurgists creating a greatly needed up-to-date reference book for engineers designing for cast iron.

The handbook presents considerable new material in addition to completely revising many of the tables and material carried over from former handbooks. The authors have broken with tradition and are not rehashing over material from previous handbooks and are presenting only data vitally useful to present day practice.

A new section is presented regarding Flame Hardening. The data presented is comprehensively covered with clear explanatory line drawings and charts. The chapter on metallic and non-metallic coatings describes the various finishes which are especially designed and adapted to castings. One is especially taken by the clear manner in which the authors have described the newer coatings useful to the founder such as the cementation coatings which can be applied to cast iron to produce more wearable surfaces.

Metallurgists will find the physical properties tables more complete than ever presented before; in addition to the usual tensile tables the authors have presented data on endurance limit, Jominy end quench, hardenability, impact strength, dimensional stability, creep and stress rupture. The tables are especially useful to the designer and user of nodular iron.

This reviewer was impressed by the chapter on welding joint cutting and repairing of castings. The portion of the chapter relating to repairing is worth the price of the handbook alone.

R. D.

Pre-Stressed Concrete

Pre-Stressed Concrete by R. H. Evans and E. W. Bennett, John Wiley & Sons, Inc., New York 1, N.Y. 1958. Pages, 290. Price, \$10.00.

In adding this volume to the increasing number of books on the subject, the authors have considered the needs of both the engineering student and the practicing engineer.

Part I of the book provides the development of the basic principles which apply to all types of pre-stressed concrete structures. The principles are established theoretically, but constant reference is made to experimental work to confirm theoretical conclusions. Examples are provided after each of the four chapters in this section for the student to work himself.

Part II of the book deals with the design of simply supported beams using procedures which would be similar to those used in the design office. The authors, who are on the staff of the University of Leeds, England, have based the

formulae notation upon the recommendations of the First Report of the Institution of Structural Engineers. However, a list of equivalent American notation has been provided as a convenience. This section of the book will be of particular value to those embarking for the first time on the design of pre-stressed beams.

Part III presents an introduction to some of the more specialized types of pre-stressed structure. Among the topics discussed are composite construction, ultimate strength, foundations and underpinnings, tunnel linings, indeterminate structures, pre-stressed dams, spherical domes, and cylindrical shells. The extent of the field has made it impossible to present more than an outline of the main principles, but a sufficient foundation is given the reader to enable him to use the more detailed literature becoming available. Adequate reference material is quoted at the end of each chapter.

G.D.W.

Land Development

Home Builders Manual for Land Development, second revised edition, by M. S. Wehrly, M. R. McKeever, F. E. Wegner, et al., The National Association of Home Builders of the United States, Washington 6, D. C., 1958. Pages, 264. Price, \$5.00.

While designed primarily for land developers, this book can be of practical significance to architects and engineers whose work carries them into the fields of planning and design of subdivisions, shopping centers, and communities' facilities.

There are ten parts and 39 chapters in this book which discuss such phases of land development as planning and zoning regulations, community vs. individual water and sanitary sewage disposal systems, location and grouping of small homes, parking for the small shopping center, and conservation practices in subdivision planning. These and other problems are presented and illustrated (the book contains 109 illustrations and graphs) throughout the volume in a clear and understandable fashion.

Cost data as presented in this book are from 1952 and therefore do not accurately reflect present conditions, but since they are used for comparative purposes only, they do not detract from the general value of the book.

Although not strictly speaking a "technical" book, this manual will prove itself useful to those who deal with the problems of land development.

A.A.A.

Philosophy of Structures

Philosophy of Structures by Eduardo Torroja. English version by J. J. Polivka and Milos Polivka, University of California Press. First edition, 1958. Pages, 366. Price, \$12.50. This review appeared in the November, 1958 issue of this magazine and showed an incorrect price of \$15.75.

Dear WSE Member:

When inviting your engineer friends to join the Western Society of Engineers, inform them of the following advantages:

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Imperial Poly-Flo tubing is offered in all colors in the $\frac{1}{4}$ " and $\frac{3}{8}$ " OD sizes, in black and natural in the $\frac{1}{2}$ " OD size, and in black only in the $\frac{5}{16}$ " size. Besides the 8 standard ISA colors, gray is available in their $\frac{1}{4}$ " and $\frac{3}{8}$ " OD Poly-Flo tubing. Colors other than those listed are available on special order.

A complete line of Poly-Flo fittings is provided for all these sizes of tubing.

For additional information, write *Midwest Engineer*, Key 1201.

Slide Rule

Frederick Post Company, Chicago, announces the development of a compact, highly efficient professional slide rule in shirt-pocket size. The Pocket Versalog weighs only $1\frac{1}{2}$ ounces, measures $6\frac{3}{4}$ " long, contains 23 versatile scales and is the perfect answer to the need for a highly accurate instrument for those on-the-spot, rapid calculations.

The rule's construction is patterned after the famed 10" Post Versalog. Overlaid with snow-white celluloid on which the 23 scales are engine-divided in sharp, easy-to-read markings, each graduation is cut to hairline precision with accurate machine control. Furnished in a handsome leather case with pocket-clip, the Pocket Versalog is constructed of laminated bamboo. The rule resists warpage to a high degree, while natural sealed-in silica make the rule function more smoothly as the years go by *without ever a need for lubricants*.

Color coding of the trigonometric scales simplifies their use in conjunction with the C, D, and CI scales. Calculations involving trigonometric functions may be performed more easily with less chance of error by simply matching the color of the trigonometric scale being used with the same color of the corresponding C, D, or CI scale.

The same R1 and R2 scales, patterned after the 10" Versalog, permit square root computations with far greater accuracy than with A and B scales . . . four log log and four reciprocal log log scales give the Pocket Versalog tremendous versatility.

The log log scales cover a range from

0.00005 to 0.999. Symmetrical arrangement of these two groups of scales permits greater facility in determining reciprocals and hyperbolic functions.

For further information write *Midwest Engineer*, Key 1202.

GLX-W Steels

Great Lakes Steel Corporation has announced a new line of high strength steels called GLX-W. The new line consists of a series of fine grained, mild carbon steels of unusually high strength, toughness and weldability.

Great Lakes Steel Corporation is a division of National Steel Corporation.

GLX-W steels are available in yield strength from 45,000 to 60,000 psi with good ductility. They possess good notch toughness at normal and subnormal temperatures. Their low carbon and manganese content provides freedom from underbead cracking under adverse welding conditions.

The combination of these mechanical properties together with lowered material and manufacturing costs and simplified fabrication processes is believed by Great Lakes Steel to indicate a wide range of applications for GLX-W steels.

Laminum

Custom-made shims of aluminum, produced by the Laminated Shim Company and known by the trade name of Laminum, are now available with lamination thicknesses of .002" or .003". The product was formerly made of .003" laminations only.

The aluminum foil laminations used in the manufacture of Laminum conform to U. S. Specifications QQ-A-561. The product is also made of part solid, part laminated aluminum, conforming with Boeing Process Specifications BAC-5430 and Boeing Materials Specifications BAC-1524.

A catalog page "Revised Engineering Data" details the specifications for Laminum Shims of aluminum, as well as of stainless, mild steel and brass. Copies are available from the Home Office in Glenbrook, Conn. or from the west coast Sales Office at 600 Sixteenth St., Oakland 12, California.

Tube Bender

The Wallace Supplies Mfg. Co., Chicago, is introducing the latest precision tube bender in its "Consensus" line for the bending of thin walled stainless and aluminum tubing.

It will bend to a maximum of 180 degrees in stainless steel tube to 5" O.D. x .085 wall or in aluminum tube to 6" O.D. x .065 wall, depending on alloy and yield point. RPM of bending arm is approximately $2\frac{1}{2}$ maximum. Mandrel clearance of 12' 6" is standard but may be extended to order. Radius adjustment of 28" maximum.

Bending is controlled by the "Direct-Action Remote Controlled" hydraulic circuit. This allows the operator of the bender to control bending from a wide area.

Measuring devices are not needed to set-up the machine. Micrometer positioning dials for the pressure die, clamping die and shoe are built into it. Degree of bend is selected from the degree dial. Length gauges are set from a length scale mounted on the machine. A pro-

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tractor is built into it for rotation of planes between bends. There is an eight (8) station degree of bend selector for a series of bends on a single length of tubing. By having the bends needed on a length of tubing placed on a process card any inexperienced operator can set up and duplicate exactly the original bends made.

These features assure simple set-ups, simple operation and quality production.

Locking Drive Pins

A completely new line of Groov-Pin locking drive pins only 1/32 inch in diameter and as short as 1/8 inch long, smallest solid pin manufactured, is now being made by the Groov-Pin Corporation, Ridgefield, N.J.

Ideally suited for connecting or locking together two miniature parts, they can be used in such fields as jewelry, optical equipment, manufacturing, etc. They are available in quantity and can be supplied from stock.

They are made in four types with grooves to meet all requirements, and are of 6150 chrome-vanadium or stainless steel 303. They can be used to replace plain pins or bent wire fasteners.

Held within tolerances of ± 0.001 , the new pins range up to 1/2 inch in length.

These new miniaturized Groov-Pins are in addition to Groov-Pin's complete line of regular pins and Tap-Lok self-locking threaded inserts.

For further information contact *Midwest Engineer*, Key 1203.

Mounting Pads

Neoprene mounting pads for isolating vibration, preventing machinery travel and deadening noise are now available from T. R. Finn & Company, Hawthorne, N. J.

Known as PadZorbers, these 18-by-18-inch ribbed sheets can be cut to any shape to fit under the feet of punch presses, drill presses, lathes and other machinery, as well as laboratory tables, air conditioning units, etc. Trimmed quickly and easily with knife or shears, they reduce vibration transmission by up to 80 per cent.

PadZorber sheets have deep rugged cross-ribs molded on each side with ribs on one side at right angles to those on the other side, thus eliminating machinery travel.

Manufactured in load ranges up to 3,500 lbs. per square foot, PadZorbers

may be used without bolting or built-up bases. Under extremely heavy loads steel bearing plates are recommended to assure even load distribution.

For further information, write *Midwest Engineer*, Key 1204.

Rivet Setting Machines

A recently introduced complete line of automatic machines for setting electrical contacts made from precious metals has opened unlimited avenues for design engineers faced with the ever present problem of producing top quality products at low cost.

The machines are products of the Judson L. Thomson Manufacturing Co. of Waltham, Mass. World leaders in the design and manufacture of rivets, the company is the only manufacturer in its field to offer a complete line of rivet setting machines, electrical contacts made from the whole range of precious metals and, now, the electrical contact assembly machines.

Designed for the manufacture of high grade electrical contact assemblies on a production basis, the Thomson machines completely outmode the old costly method of punch press type assembly. As any number of manufacturers have found, when hand operations are replaced by semi-automatic operations, the product produced is of higher quality while costly rejects are minimized. Very important from the cost standpoint is the definite reduction in direct labor costs when automatic machines are installed.

Although the Thomson automatic electrical contact setting machines follow the same basic proved design and engineering features of the manufacturer's rivet setting machines, the entirely new head and anvil assemblies make it possible to employ production line methods for set-

ting single contacts, multi-contacts and double headed contacts.

One of the most popular design features carried over to the new line of machines is the Thomson perfected automatic hopper feed method. This simple fool-proof design allows an operator to load bulk quantities of contacts into the machine. From this point on, no further handling is required by the operator. The contacts are carried automatically from the hopper through a track to the setting position.

Typical of the adaptability of these machines for manufacture of precision contacts is the model for double heading. The machine, using Thomson precision contacts, will stake and form the second head in one blow without any blade distortion. Again, the completely automatic operation substantially reduces costly operator charges and machine time, and also produces a consistently uniform product of high quality.

An added attractive feature of the above machine is its ability to form the second head to match the first, or if desired, to any specified shape. With this machine, as with all other models in the line, overall thickness of the contact assembly can be held to precision tolerances.

All models in the line are equipped with automatic hopper feed. They can be either air or motor operated, and are designed for either bench or floor installation.

The machines for setting multi-contacts are available with fixed or adjustable centers, and are capable of setting two or more contacts at one time. Along with the complete line of standard automatic electrical contact setting machines offered by Thomson, many special work handling devices have been engineered

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Glenview 4-7887

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for higher production and lower contact assembly costs. Thomson's staff of experienced design engineers is available for the design of special fixtures for specific parts to produce maximum product rates.

To quote Howard J. Lonergan, Thomson's sales manager for the Electrical Contacts Division, "Besides the full line of automatic electrical contact setting machines, a complete engineering service is available which makes recommendations not only for contact materials for specific applications, but also of the other important factors in contact design such as size, shape, form and even method of fabrication and assembly."

As part of the program introducing these machines, Thomson sales engineers will visit manufacturing plants with the smaller models to demonstrate their adaptability. The machines may be leased or purchased by contacting the home office in Waltham. Canadian manufacturers may obtain further information through Thomson (Canada) Rivet Co., Ltd., Fourth Street and Victoria Avenue, Gananoque, Ontario.

Literature

Fiberglas Insulations

"Fiberglas insulations for Industrial and Commercial Metal Buildings," is the title of a new publication which Owens-Corning Fiberglas Corporation has available for distribution without charge.

In 12 pages and by 11 photos, five tables, six sketches, and a graph, the publication illustrates and describes use of Fiberglas flexible and rigid metal building insulations. Discussed are factors such as heat losses and condensation and accessory materials for metal buildings, such as reinforced plastic paneling, ceiling board, acoustical tile, and perimeter and pipe and duct insulation.

Copies of the publication may be obtained by writing the company at its general offices, Toledo 1, Ohio.

Expansion Joint Standards

The Expansion Joint Manufacturers Association of 53 Park Place, New York City, has released a newly developed edition of Expansion Joint Standards. This announcement was made last year by George P. Byrne, Jr., secretary of the Expansion Joint Manufacturers Association.

This edition contains up-to-date information concerning the design, construction, application and testing of Expansion Joints for piping and other services. Much of this information has never been published in any text or reference book, and for this reason will be of real value to the thousands of manufacturers, contractors, engineers and Government officials who specify and purchase Expansion Joints of the types covered.

The new material and data contained in this first edition of Expansion Joint Standards was compiled by the Technical Committee of the Expansion Joint Manufacturers Association.

The format of the first edition is 8½" x 11" with semi-flexible simulated leather cover. Copies of the new edition are available at \$1.00 postpaid.

Fractional Horsepower Motors

New, revised, 8 page bulletin, published by the Bodine Electric Company, 2500 W. Bradley Place, Chicago 18, Ill., describes and illustrates in detail the construction of their a-c and d-c Type "N" fractional horsepower motors.

Bodine Type N fractional horsepower motors afford the industrial designer a wide choice of physical and electrical characteristics. Type N motors are available in three basic sizes, and each size is furnished in several lengths. The smallest Type N motors are only 3⅜" in diameter, and the largest are just 5½".

These standard motor frames can be furnished with almost any type of winding—split-phase, capacitor, and poly-phase a-c motors; shunt and compound d-c motors; and series wound motors for both a-c and d-c. While the standard

ratings range from 1/150 to 1/6 hp at 1725 rpm, Type N motors are furnished in other ratings and speeds. Speed reducers and other modifications can also be provided.

Films

Concrete Highways

A film entitled "Low Cost Concrete Highways With the Slip-Form Paver" was premiered in Washington, D.C., on Dec. 18 by the Portland Cement Association before members of the U.S. Bureau of Public Roads with H. A. Radzikowski, chief of the bureau's Development Division, presiding.

The 16 mm film, which is in sound and color, shows how concrete pavement is placed with the latest model of slip-form paver. It includes the various methods of fine grading operations, as well as mixer operations for shoulders and roadbeds where shoulder widths will not permit use of the mixer.

Twelve minutes in length, the film is of special interest to engineering and contracting personnel, since it depicts all of the paving operations with a slip-form paver from grading and placement to the curing and sawing of joints. The final sequence features a ride down a recently completed section of Interstate highway in Colorado, where roughometer tests show it to be comparable to paving by conventional methods in that area.

The film is available on a free-loan basis through all Portland Cement Association District Offices, as well as its headquarters in Chicago.

More than 21 percent of 1957 U.S. highway deaths occurred on Saturdays.

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Ramo-Wooldridge Dedicate Labs

A 90-acre site that will contain one of the most advanced research and development facilities in the country, the Ramo-Wooldridge Laboratories, was officially dedicated during impressive ceremonies in Canoga Park, Calif. on Dec. 12. It is scheduled for initial completion in late 1959.

Ramo-Wooldridge Laboratories, which will comprise the California research and development facility of Thompson Ramo Wooldridge's industrial and manufacturing interests, will be directed by Dr. Ralph P. Johnson, vice-president and general manager of R-W. Research and development will be conducted in electronic reconnaissance and countermeasures systems, infrared systems, analog and digital computers, air navigation and traffic control, anti-submarine warfare, electronic language translation, information processing systems, nuclear energy application, missile electronic systems, advanced radio and wire line communications.

Major construction activities were expected to commence within the next few weeks. The initial \$10.5 million building phase will cover the northern half of the acreage immediately adjacent to Chatsworth Reservoir.

Included among the first six buildings slated for late 1959 completion are two research and development prototype buildings, which will house scientific offices and laboratory spaces; a four-story administration building expected to accommodate the West Coast executive offices of Thompson Ramo Wooldridge Inc., as well as spaces for the Laboratories' administrative staff; a cafeteria-auditorium; a research and development prototype engineering facility and service building; and a site utility center. These structures will provide a total of approximately 380,000 square feet.

Latest design and architectural-engineering experience in electronics research and development have been incorporated in the plan of the Canoga Park laboratories by R-W planners and A. C. Martin and Associates, architects-engineers. Contract for construction has been awarded Twaits-Wittenberg, general contractors.

Buildings will be grouped around rising ground in the center of the property with a landscaped mall in the center.

Unique feature of the mall will be two rectangular spray pools which will serve an aesthetic purpose as well as evaporate water for air conditioning the buildings. This will eliminate unsightly cooling towers on the property.

Configuration of buildings will be in the form of a "T" to provide adequate office space with an exterior outlook. Twenty-five percent of the offices will be designed for single occupancy and seventy-five percent for double. Covered walkways will connect all of the facilities.

A raised mound, landscaped with trees and foliage, will form a 100-foot deep perimeter on the Roscoe Boulevard and Fallbrook ave. boundaries of the property. Necessary fill to form this rise will come from redistribution of earth already present.

Approximately two thousand scientists, engineers and administrative personnel are expected to initially occupy the new development.

Construction of Ramo-Wooldridge Laboratories is the second major step taken by the five-year-old electronics firm in the past year. In October it merged with Thompson Products of Cleveland to become Thompson Ramo Wooldridge, Inc., thus combining the research and development talent of R-W and the precision manufacturing experience of Thompson Products.

At the time of the merger Space Technology Laboratories, formerly a division of The Ramo-Wooldridge Corporation, became a separate corporation. Under this agreement Space Technology Laboratories Inc. will occupy the 41-acre site and facilities near Los Angeles International Airport, presently housing Ramo-

Wooldridge, when R-W moves to Canoga Park.

Founded in 1953 by Drs. Simon Ramo and Dean E. Wooldridge with the financial assistance of Thompson Products, the Ramo-Wooldridge division of Thompson Ramo Wooldridge Inc. has grown from a 1,000 square foot rented office in Westchester to the approximately 586,000 square foot research and development center at Aviation and El Segundo blvds., Southwest Los Angeles.

G. B. Warren Elected President of ASME

Glenn B. Warren, vice-president and consulting engineer of the turbine division, General Electric Company, has been elected President of The American Society of Mechanical Engineers.

ASME Secretary O. B. Schier made the announcement following official tabulation of the members' vote ballots.

Elected to serve with Mr. Warren were five vice-presidents. They are: Charles H. Coogan, Jr., head of the Mechanical Engineering Department of the University of Connecticut; Gordon R. Hahn, assistant chief mechanical engineer for Gibbs and Hill, New York; John W. Little, president of the Goslin-Birmingham Manufacturing Company, Alabama; Thomas J. Dolan, head of the Department of Theoretical and Applied Mechanics at the University of Illinois; Harold Grasse, partner in Black and Veatch, Kansas City, Mo.

In addition, Arthur M. Perrin, president of National Conveyors Company, and Richard G. Folsom, president of Rensselaer Polytechnic Institute, were elected directors of the 50,000-member Society.

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Master Slaves Do "Hot" Work

The Argonne National Laboratory has pioneered for more than a decade in development of machines for doing work in highly radioactive areas where humans cannot tread.

Argonne's Remote Control Engineering Division, Raymond C. Goertz, director, has produced a series of master-slave manipulators, mechanical hands with "feel."

These devices are designed to permit work with highly radioactive materials behind heavy shielding. Argonne has developed two basic types of manipulators: mechanically controlled and electronically controlled. The latter type was displayed by the Laboratory at the 1958 World's Fair in Brussels, Belgium.

Another product of Remote Control Engineering Division research is the mobile "slave-robot," designed for repair and handling operations in areas contaminated with radioactivity. A prototype of the robot—called Model 3—was exhibited by Argonne at the Second International Conference on the Peaceful Uses of Atomic Energy at Geneva, Switzerland.

Along with these machines, the Laboratory's remote control personnel have designed a number of shielded facilities for "hot" lab operations, and two different types of shielding windows for "hot" caves.

Nuclear scientists are concerned with protection from three types of radiation: alpha particles, which do not have penetrating powers; beta particles, which travel a few feet in the air and can be stopped by an inch of wood; and gamma rays, which are stopped only by a large amount of heavy shielding.

Uses of master-slave manipulators and other protective devices depend on the amounts and kinds of radiation present. Scientists have found in some cases that rubber gloves supply adequate protection. In others, completely dust-proof plastic suits with an outside air supply are used. Master-slave manipulators enable an operator to perform work behind heavy shielding in a natural manner with no special protective clothing required.

Remote control engineering for nuclear science was accelerated after World War II.

During the early post-war expansion of the U. S. Atomic Energy Commission,

the problem arose of handling materials at much higher levels of radioactivity than those previously used.

Nuclear science required work with gamma activities of thousands of curies. (Gamma rays—the most penetrating of all radiations—are very high energy x-rays. A curie is a measure of the rate at which radioactive material throws off particles. The radioactivity of one gram of radium is one curie.) War-time facilities for such research were limited and inadequate for the accelerated post-war program.

Analysis of the program indicated that too much emphasis had been placed on the equipment at a remote point, and not enough on the operator. It seemed that a much better approach for research work by remote control would be to start with the operator, considering him to be the most important part of the over-all system, and to extend his skills so he could perform work from which he was physically separated.

Goertz commented:

"We know, from a physics point of view, that an object can have only six independent motions in space:

1. up and down
2. to the left and right horizontally
3. forward and back, and three independent rotary motions
4. azimuth (pointing the manipulator tongs in the direction of the object you wish to pick up)
5. elevation
6. twisting

These last three might be described as degrees of angular freedom.

"These six motions, together with a seventh, needed to grasp an object, are the basic motions of the human hand. We have built all seven motions into our manipulators."

The mechanical hands were named master-slave manipulators because all of the seven degrees of freedom in the tongs were "slaved" to the single master handle.

The approach taken by Argonne was to provide the scientist with easily controllable mechanical arms and extend his binocular vision. In this way, he could operate existing standard laboratory equipment behind shielding barriers with minimum modification. At the same time, he would be prepared for unpredictable requirements and emergencies.

In the Argonne system, the operator's eyes are effectively extended with direct binocular vision by large, non-darkening shielding windows. His arms are extended by highly dexterous and force-reflecting master-slave manipulators.

The operator is an integral part of the system and works in a natural manner. He works automatically, without having to give special thought to each succeeding move. This system provides manipulation that was impossible with periscopes or mirrors and limited purpose manipulators.

These methods have been widely copied in other nuclear science installations around the United States.

Argonne has developed a total of eight mechanically controlled master-slave manipulators, with a ninth under construction. In addition, three models of electronically controlled manipulators have been produced. The second was exhibited at the Brussels World's Fair and the third was part of the slave-robot demonstration at Geneva.

Developmental work on an electronically controlled manipulator was started

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by the Remote Control Engineering Division in the early 1950's. This type of manipulator has the advantage of increased mobility over its mechanically connected predecessors. The master-slave arms are controlled by means of electric wires, eliminating the need for direct mechanical connections. This extends the range of the manipulators and the variety of work that can be performed.

The electronic manipulators feature a force-reflecting servo-mechanism, which is a significant advance in the development of remotely controlled manipulators.

This mechanism automatically controls the output, or slave arm, to follow the input, or master arm, and at the same time reflects the force acting on the slave back to the master handle. In this way, the operator gets the "feel" of the object he is handling by remote control.

Ordinary servo-mechanisms do not reflect force, although they do control the output to automatically follow an input command by acting to make the output agree to the input command. An example of a common servo-mechanism is a revolving gun turret.

The slave-robot prototype developed by Argonne is a forerunner of similar units which will work in radioactive laboratories. The robot, weighing more than a ton and standing 8½ feet at its maximum height, acts only by electrical orders relayed to it by the operator.

It can carry 30 pounds continuously and 50 pounds intermittently with each of the two electronically controlled arms. The only self controls it has are force limiters to keep it from lifting loads which are too heavy, or moving beyond predetermined limits. The robot has a stereo television system for auxiliary "seeing."

The Argonne National Laboratory is operated by the University of Chicago for the U. S. Atomic Energy Commission and is located on a 3,700-acre tract of land 25 miles southwest of Chicago near Lemont, Ill.

Weather, Please

Meteorology computers, packaged in battlefield consoles, are automatically issuing high-altitude weather reports for the Army, *Electronics* reveals. An antenna tracks a weather balloon, while

other information is radioed from instruments on the balloon, to the computer, which figures pressure, humidity, temperature and wind readings.

Servomechanisms Gets RCA Contract

Servomechanisms, Inc., Hawthorne, Calif., has received orders in the amount of \$507,909 from the Radio Corporation of America for the production of SMI's Barometric Altitude Controller. This precision instrument, which is sensitive to minute variations in static pressure, maintains an aircraft at a constant barometric altitude.

The Controller, which is sensitive to within plus or minus 2½ feet at sea level, provides a shaft position output which is linearly proportional in rotation to altitude deviations from any given reference altitude within the range of from minus 1,000 feet to plus 60,000 feet.

Servomechanisms, Inc., is a leading supplier of advanced electronic and electro-mechanical sub-systems and components for the aircraft, missile and astronautics industry.

Die Life Can Be Increased by 360%

Following a series of field tests at Arvin Industries, Inc. (Columbus, Indiana), it was discovered that die life can be increased 360 per cent by switching to a special tool steel for use in die casting dies.

Arvin Industries makes seal rotor laminations for Arvin Fan Forced Electric Heater motors by centrifugally die casting molten aluminum around the laminations with motor shafts already inserted.

This meant the molding was fast, which was necessary for low cost production. The problem was to avoid extra set-ups of dies, and to eliminate machine down-time, make maximum use of labor hours, and decrease rejects of rotors caused by fast die wear.

Die wear was especially short. Some dies lasted as little as two hours, with an average life of from eight to forty hours. In such a high production shop, this meant that two men were kept busy full-time producing molds to assure high standards of end product quality.

Allegheny Ludlum Steel Corporation engineers were called in. They suggested a change in the die material. The switch was made to Potomac M with L-XX (T-1) high speed steel inserts. Potomac M is a 5 per cent chromium, one per cent vanadium tool steel, and was selected because of its toughness and resistance to wear at elevated temperatures.

The inserts, which accurately shape the rotor ends, are made from Allegheny Ludlum's L-XX (T-1) high speed steel to resist tempering and reproduce sharp detail on extremely long production runs.

The average age of the trial dies was more than two years without failure.

Fire Truck Warning

Flashing red and yellow lights on busy street corners in New York City soon will warn motorists of approaching fire trucks, reports *Electronics*. A three-watt f-m transmitter that is installed on the fire vehicle and operated by the driver, will activate the signals located on poles near the intersections.

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C-7196 ELECTRICAL DESIGN ENGR. BSEE age to 35; 2-5 yrs. exper. research & devel. computers, instrumentation, know electronics circuitry, transistors, computing techs. Duties: Member of Elect. Design Section concerned with variety of electronics instrumentation programs. Position requires theoretical knowl., some lab. exper. & versatility, some travel, car req'd. sal. \$7-9,000 loc. No. Shore Chgo. Suburb.

C-7198 INDUSTRIAL ENGR. IE or ME Training age to 40; 2+ yrs. exper. in general industrial engr. know machine shop operations. Should have some exper. with punch press, lathe-welding & painting operations for a mfr. of controls & electro-mech. devices, sal. up to \$7800 dep. on exper. loc. No. Ill.

C-7200 DESIGN ENGR. ME degree age under 50; 3 yrs. exper. in backhoe design & devel. of backhoe attachment for industrial tractors. Work is with a small firm specializing in product devel. sal. \$12,000+ loc. Ill., employer will pay the fee.

C-7201 SALES ENGRS. (2) Grad. EE pref. age to 35; 3+ yrs. in instrumentation sales. Duties: Contacting indus-

tries in No. Ill., No. Ind. & So. Wis. selling instruments—for the time being mainly on oscilloscopes; company is devel. additional products to add to present line for a mfr. sal. \$10,000+ loc. Chgo. Hdqrs., employer will pay the fee.

C-7202 RESEARCH LIBRARIAN Grad. CE age to 35; Recent grad. to several yrs. exper., knowl. of construction helpful. Duties: Act as research librarian for bldg. materials trade association sal. \$5500-7500 dep. on exper. loc. Chgo., employer will pay the fee.

C-7203 DESIGN ENGR. BSME pref. age to 40; 3 yrs. exper. in design & production of earth moving & related eqpt. or 5 yrs. + exper. if no degree. Duties: Design & production of earth moving & related products. Considerable board work to start sal. \$7500-8,000 loc. Ill., employer will pay the fee.

C-7204 PLANT & DESIGN ENGR. Grad. ME or equiv. 4+ yrs. in machine design in metal processing & fabricating industry, plant heating & process ventilating. Duties: Investigate req'ts., design, procure components, coordinate construction & installation of eqpt. either as or in support of project engr. perform other duties as are customarily assigned in plant engrg. work, sal. open loc. No. Mich.

C-7205 DEVEL. & DESIGN ENGR. Grad. EE age 40+; 5+ yrs. in audio & speaker devel. & design. Knowl. of production operations helpful. Duties: Devel., design & testing of audio eqpt., speakers & components. Should be able to take project from initial stage follow thru design, test & devel. up to production. sal. \$6-10,000 loc. No. Ind. employer might negotiate the fee.

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Crerar, Great Research Library

To supplement other library resources in Chicago, The John Crerar Library was founded, in 1895, as a free public reference library devoted exclusively to science and technology. In the sixty-three years intervening, Crerar has become the country's largest research library specializing in scientific, engineering, and medical data—its collections total in the order of a million volumes and pamphlets.

The subject interests of the founding and major engineering societies are the primary fields of concentration in the technical collections of the Library: chemical, civil, electrical, mechanical, metallurgical, and mining engineering. Many of the more recently developed engineering specialties are also receiving emphasis in the Library's acquisition program.

For example, in the field of traffic engineering—the collections contain a selection of works on general traffic engineering, including a number from Europe and extending back to a 1904 French contribution on "Circulation des Automobiles." Of perhaps greater note is the wide variety of associated subjects covered in some strength—such as safety, lighting, and construction of all kinds. Notable also are the publications of specialized groups, including engineering experiment stations of universities, and such professional organizations as the American Association of State Highway Officials. While the general aspects of city planning are not collected in strength, the coverage of technical phases of engineering, design, testing, and construction by the Library's holdings is outstanding.

Perhaps the greatest distinction of the Crerar collections lies in the thousands of book and periodical titles representing engineering publications not available in any other library in the area. It is to these that engineers and other technical personnel turn when their private or company libraries fail them. And, in this day of accelerated scientific research and development, there is need for even greater breadth of coverage—including both standard and lesser known publications.

But the Crerar Library endowment income is no longer sufficient to meet the increased demand, or even to maintain the collections at present level, in terms

of current costs. Therefore, in order to properly maintain the Library's collections and services, supplementary funds are required.

Since 1947, the Library has invited companies, societies, and individuals to contribute to its support through memberships. Company and society memberships are, of course, of great importance in helping to fund major operating expenditures, but individual memberships are more directly pertinent to the problem of maintaining the collections. Personal membership contributions of \$10 or more per year are reserved in the Members Book Fund and used to purchase current publications for the collections.

Although the proportion of the Library's income which comes from the community is still only about eleven percent of the operating funds, it is a very vital percentage. But there is serious need for the percentage to be increased. Membership participation not only offers certain special privileges, but, more importantly, with this supplementary income Crerar can maintain its collections and services at the high level required for maximum service to the community.

Stratosphere Lab

Vitro Laboratories, Silver Spring, Md., has been awarded a contract by the Office of Naval Research to conduct a study of a manned stratosphere laboratory that will be a platform for scientific and technological studies 100,000 to 120,000 feet above the earth's surface. The study is an extension of the "Strato-

Lab" research program initiated in 1954 by the Office of Naval Research.

The proposed "Strato-Lab" will be suspended from a high-altitude balloon, enabling scientists to remain aloft for extended periods of time. In addition to research in the pure sciences, the "Strato-Lab" will have possible application in such diverse fields as weather prediction and communications.

The recent record-breaking 34-hour balloon ascent, under ONR auspices, of Commander Malcolm D. Ross, USNR, and Lieutenant Commander M. Lee Lewis, USN (Ret.), to 82,000 feet was one in the continuing "Strato-Lab" flight program which has demonstrated the feasibility of research flights into the stratosphere.

Vitro announced that its work on the Navy project will be directed by Dr. J. J. Freeman, a specialist in the field of systems analysis, with assistance from Dr. Norman Phillips, an authority on space physiology, and Rear Admiral A. E. Becker, USN (Ret.), military adviser, both of the Vitro staff. Consultants for research in the physical sciences during the formulation and execution of the program will be: Dr. J. A. Van Allen, physics, University of Iowa; Dr. S. F. Singer, upper atmosphere physics, University of Maryland; Dr. D. H. Menzel, astronomy, Harvard College; Dr. Bernard Haurwitz, meteorology, New York University; Dr. W. O. Roberts and Dr. G. A. Newkirk, astrophysics, University of Colorado.

Outstanding scientists in those fields for which the "Strato-Lab" will have potential research application are being invited by Vitro to participate in formulating specifications for the floating laboratory.

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Heating Dept. Brain-Child Saves

Savings of up to 50 per cent over the cost of constructing underground steam lines by conventional methods are promised by a new system announced jointly by Consumers Power Co. and Badger Manufacturing Co., following an eight-month service test.

The "brain-child" of Consumer Power's Steam Heating Department, in most applications the new pipe laying and insulating system eliminates the need for costly concrete conduit and man holes. An installation is as simple as this: the trench is dug; pipe, including expansion joints and other fittings, is laid; pipe anchors, guides and supports are installed; then the line is packed with granular poured-in-place hydrocarbon insulation and covered. As the line is heated, the insulation "cures" to a three-layer protective and insulating covering—ranging in form from plastic, where it is in contact with the line, through a sintered consistency in the middle layer, to loose granules on the outer layer.

Similar steam line installation methods suggested in the past stumbled over a number of problems, principally expansion joint design. Conventional packless corrugated types could not readily be fitted with covers which would protect the bellows, or corrugated elements, from loose insulating material unless the joints were in a man hole or enclosed in a concrete box.

Engineers at Consumers Power's Steam Heating Department thought they saw a solution to the problem when they were introduced to the Badger S-R Expansion Joint by the Dale Prentice Co., Detroit, Badger representative. The Badger S-R Expansion Joints are fabricated entirely from weldable wrought steel and since there are no bulky castings to interfere, this compact package design makes them ideal for the installation of the heavy duty covers which are required to protect the bellows from damage due to the weight of insulation and earth.

After Consumers Power and Badger had jointly worked out the few modifications required, an actual installation was made during September 1957. Seventy-five feet of 3" steel pipe which included a Series 150 expansion Joint Model 3-4W8 was laid in a 30" trench connecting the steam distribution main and a building of the Saginaw Business

Institute. Two and a half tons of granular insulation were packed around the line to a depth of 4". The trench was back-filled and the line placed in operation in September 1957.

In May 1958, a 4-foot section of the line was dug up directly over the joint. A careful examination of the line indicated that no insulation had entered the cover of the expansion joint and that it had functioned perfectly.

Machine Separates Salt from Pepper

A machine that can take a mixture of salt and pepper and quickly separate it into two quantities of pure material has been developed by General Mills, Inc.

L. F. Borchardt and William A. Brastad of the company's Central Research Laboratories announced the development of the General Mills "E-Machine"—designed for more serious business than the salt-pepper problem.

The "E-Machine" is believed to be the first successful electrostatic device for separating flour milling stocks. Its ability to separate particles on relatively slight electrical differences has caused such diversified interests as mining companies and seed firms to become very interested, too. Potential use of the new device may reach into many fields, it is believed.

In other tests, the E-Machine isolates metallic aluminum from aluminum oxide. It separates particles of titanium minerals from sand.

Brastad, section leader of the Applied Physics Section at the Laboratories, has

been most closely associated with the E-Machine during its 11-year development period.

"Originally, we were trying to improve the electrostatic separation process used with some success in the mineral field," he said. "Our aim was to perform the more difficult separation of bran from flour-bearing particles in wheat milling. Existing machines wouldn't do the job so we tried some new ideas. The E-Machine is the result."

"The E-Machine seems to have good potential as a tool in some ore separation processes," Borchardt said. "It would probably not be practical on a low-cost mineral, such as taconite, but it has opened speculation in other areas."

Borchardt, director of the Physical Research Activity at the Central Research Laboratories, said that the new device has proved in tests that it will recover valuable grains of pure minerals from beach sands. Wolframite, ilmenite, rutile, and zircon have been separated from silica and other minerals.

The new device has shown that it will also isolate healthy seeds from inferior and foreign seeds of the same size.

In operation, the E-Machine takes advantage of the differences in electrical properties of the particles to be separated. As the mixed particles are fed into the machine, they move along a conducting deck which is maintained at ground potential, electrically. Above, metal troughs or channels are maintained at a relatively high D.C. potential.

As it moves along, each particle accepts an electrostatic charge of polarity and magnitude corresponding to its own electrical characteristics. If it ac-

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cepts enough charge of polarity opposite to that of the upper electrode, it bounds upward into the troughs. If not, it either remains on the lower deck or rises only part way and falls back.

One unique feature of the machine is the prolonged opportunity it gives each particle to acquire its characteristic charge. Another is the precise separation possible, based on the opposition of electrostatic and gravitational forces.

"Versatility of the E-Machine is high," Brastad said. "Voltage and polarity of the electrode can be adjusted to suit the job to be done. The device can be tuned to isolate first one type of particle, then another."

General Mills, now able to make a precise electrostatic separation of bran from flour-rich particles, believes the E-Machine has too much general potential to be restricted to milling, he added. Separation problems in many fields are now being sought.

Reactors Cooled by Sodium Said Feasible

Sodium cooled reactors are technically feasible and the "sodium-graphite approach to economic nuclear power is indeed a very promising one."

So reported three Atomics International engineers in a paper, "Performance of the Sodium Reactor Experiment," presented at a Nuclear Power Plant symposium during the Fall General Meeting of the American Institute of Electrical Engineers in Pittsburgh on Oct. 29. The authors were J. E. Owens, W. T. Morgan, and L. E. Glasgow, of Canoga Park, Calif. They described a year's operation of the Sodium Reactor Experiment, which was conducted by Atomics International Division of North American Aviation as part of a program with the U. S. Atomic Energy Commission for the development of the sodium-graphite approach to economic nuclear power. The Sodium Reactor Experiment (SRE) reached criticality April 25, 1957.

"The excellent performance of the SRE has shown that sodium cooled reactors are technically feasible and that the sodium-graphite approach to economic nuclear power is indeed a very promising one," they said. It was emphasized that SRE is an experimental plant and said that the Hallam Nuclear

Power Facility project is making full use of the experience and information obtained from SRE.

"As a result of improvements in the design and operation procedures already made, it is expected that the Hallam Nuclear Power Facility will be put into operation on a schedule approximating that of a conventional power plant," the authors said. "There is no reason to expect more difficulties in the startup of a sodium graphite reactor powered steam plant than might be encountered in an oil or coal fired plant of comparable rating."

Silicon Controlled Rectifier Adaptable

The newly developed silicon controlled rectifier is adaptable to "many new fields of application for semi-conductor devices," the Fall General Meeting of the American Institute of Electrical Engineers was told in Pittsburgh, Pa. on Oct. 28, by D. K. Bisson and R. F. Dyer of the General Electric Co., Clyde, N. Y.

Among other applications, it is possible that the rectifiers may replace thyratrons, magnetic amplifiers and relays in such applications as static switching, motor speed control, inverters and voltage suppression, the two men said in a paper presented at the meeting.

"The name Silicon Controlled Rectifier," they said, "has been given to a new three-terminal semiconductor device which has electrical characteristics similar to a thyatron . . . Its characteristics are made possible through the use of a PNP junction configuration. It is capable of handling currents up to 16 amperes average at peak loads up to 300 volts. Its fast switching action, small size

and relatively high current ratings make this new device adaptable to a great many applications."

Tube Maker Follows ISA Code of Colors

Following practices tentatively recommended by the Instrument Society of America in color coding of panel tubing, The Imperial Brass Mfg. Company of Chicago is offering its Poly-Flo polyethylene tubing in all ISA colors, it has been announced. In addition to the 8 proposed standard ISA colors the Imperial line also includes gray.

The company's color designations have been revised where necessary to agree with ISA recommendations. Previous to the development of the new code, Imperial officials pointed out, there was no uniformity in selection of a given color for a given service. The new colors were selected for ease of identification, recognizable duplication, and because they have relatively high fade resisting qualities.

The ISA recommended color code is red for air supply; orange for transmitted measurement to receiver element; yellow for controller output to valve, pneumatic set slave, etc.; purple for seal (to remote mounted controller); black for set (to remote mounted controller); green for branch transmittal measurement to alarm element; and blue for branch transmittal measurement to readout element. All other service lines will be in natural. Natural is defined as uncolored copper, aluminum, stainless, uncolored plastic and other tubing materials such as cadmium-plated copper, white pigmented plastic, etc.

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"Brain" Searches Technical Lit.

Conclusive proof that technical and scientific literature in the field of metals engineering can be searched by an electronic "brain" has resulted from a pilot plant research program sponsored by the American Society for Metals. Purpose of the experimental project was to answer the question, "Is machine searching of metallurgical literature feasible?"

The "yes" answer has been reached after only three years of a projected five year program conducted for the Metal Society by the Center for Documentation and Communication Research at Western Reserve University. As a result, an increase to \$22,000 annually of the grant to the Documentation Center at Western Reserve has been announced by the ASM Board of Trustees. This increase will provide for gradual transition from experimental to operational stage and provide the means for training and building a staff for an eventual "ASM Metals Information Center."

In such a metals information center the important metallurgical literature—books, technical papers, articles from engineering periodicals, government reports—will be abstracted or condensed and the abstracts put into code form. The machine will search this encoded data for references to specific information on desired subjects.

The grant which was expanded by \$7000, originally had been for \$75,000 over a five-year period, or \$15,000 yearly. It was for preparation of 25,000 metals science documents in code form for machine searching on an experimental electronic searching selector built at WRU.

The goal of 25,000 encoded documents has not been reached, but test runs on the experimental electronic searching selector have been eminently successful. Actual questions and subjects for searches were volunteered by more than 100 ASM members—then reported back to the originators for evaluation as to search effectiveness.

ASM Trustees' green light for an expanded "searching" project will make possible preparation of encoded abstracts numbering 7500 during 1959, an increase from the 5000 previous rate.

Testing during 1959 will be put on a strictly current basis. That is, encoded abstracts will be prepared from metals

periodical literature and other documents as soon as they are received at the center. The searching machine will be permanently wired for ten carefully selected typical questions, and searches made week by week or month by month of the current literature.

Such "current" searching, tailor made to suit the needs of the individual, will be the immediate goal of an eventual ASM Metals Information Center. The building of a library of encoded abstracts suitable for a bibliographic searching service of previously published information will require several years after the start of current searching.

The literature searching project is an expansion of the conventional published abstracting service known as the "ASM Review of Metal Literature," which was established in 1944. About 12,000 documents per year are abstracted.

Uranium Green is Back from the War

Uranium colors are back from "war"!

After an enforced absence of 18 years in the interest of national security, Vitro Manufacturing Company has resumed production of uranium-based colors for the ceramic industry, it is reported from Pittsburgh, Pa.

Vitro's new line of "atomic" colors includes yellows, oranges and greens, all produced from uranium salts. Although quite harmless, the uranium adds unmatched brilliance and superior handling qualities to these ceramic pigments.

The new colors are now being manufactured at Vitro's Pittsburgh plant just

a little more than six months after the lifting of an AEC ban on non-nuclear uses of uranium.

Vitro Manufacturing, a division of Vitro Corporation of America, first produced uranium-based colors in 1926, and prior to World War II was the recognized leader in production of uranium-based colors for pottery, glass and porcelain products. However, in 1942, all industrial uranium supplies were called to war for the Manhattan Engineering District.

Vitro stockpiles and experience in uranium technology were called on to assist in various phases of the "Manhattan Project" to produce the first atomic bomb. Since then, the government has prohibited non-nuclear uses of precious uranium. Last June, the U. S. Atomic Energy Commission approved the use of uranium for non-nuclear industrial products. Vitro is believed to be the first ceramic color producer to take advantage of the new AEC policy.

The uranium salts necessary for production of the new colors are being processed by another Vitro division. These salts are processed from depleted uranium from AEC stocks available on an unclassified basis to licensed users. The resultant colors contain a small amount of uranium and are quite safe to users and handlers. No harmful radiation is involved.

Nylon Emulsion

U.S. housewives soon will have the opportunity to wax their floors, as well as their furniture, with nylon, reports *Chemical Week*. A company plans to market a floor wax utilizing nylon in an emulsion form. The one big advantage:

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it doesn't leave powder in cracks or grooves. The product is simple to remove; soap and warm water will do the job.

"Sidewinder" Contract

A \$1,000,000 contract for continued research and development of improvements for the Sidewinder missile has been awarded to Philco Corporation by the U. S. Navy's Bureau of Ordnance.

This deadly heat-seeking missile has been in operational use for over two years. Navy and Marine Corps air groups, as well as the U. S. Air Force, are arming some of their newest jet fighters with this air-to-air missile.

Philco Corporation participated with the Naval Ordnance Test Station, China Lake, Calif., in the engineering of the Sidewinder and is producing the missile.

The nine-foot, 155-pound missile can be carried in quantity by jet fighters and fired singly or in salvos. No special pilot training or complex launching equipment is necessary. Sidewinders strike their targets by homing in on the infra-red radiations (heat) emitted by the exhaust of an enemy jet.

Propellant Charges Are "Biscuit" Baked

Solid propellant charges for guided missiles are being "baked" like biscuits in a recently-installed battery of industrial ovens designed by Despatch Oven Company of Minneapolis.

The solid fuel, known technically as polysulfide polymer, is heat-cured to a black rubbery solid in a final stage of rocket engine production at Marshall, Texas, plant of Thiokol Chemical Corporation. The curing operation takes place in big, steamheated Despatch ovens, operating at the relatively low temperature range of 100 to 200 degrees F.

Solid propellants, easier and faster to handle than liquid fuel, are already scheduled for the 500-mile Pershing missile, the booster stage of the Army's Nike-Zeus anti-missile missile and the Air Force Bomarc missile's booster. In the offing, is a solid-propelled ICBM.

The liquid polymer developed by Thiokol, once only a basic ingredient for gasoline and oil hoses, is mixed with an oxidizer to become both fuel and binder for the charge. A thin coating

of propellant is sprayed in the casing and cured in the ovens, then a core is inserted in rocket engine casing and the main charge is poured around it.

After the entire engine is "baked" in the oven, the core is withdrawn and the rocket is ready to fire. Shape of the hole left by the core determines the planned burning rate for the rocket.

Germans Dedicate Maritime Reactor

A combined nuclear reactor and research facility dedicated near Hamburg in the latter part of 1958 placed Germany high on the list of nations developing atomic power for peacetime use on the high seas.

Consisting of a reactor core and four special-purpose pools, the unit is the largest of its type ever built. It is also the first European reactor to be built expressly for marine applications, according to spokesmen for The Babcock & Wilcox Company, designer and supplier of the major reactor components.

Owned and operated by The Society for the Utilization of Nuclear Energy in Shipbuilding and Navigation, Inc., the research unit is 89 feet long and 29 feet wide. It is unique in that it has four pools built in series instead of the more conventional double pool. Two of the pools are capable of sustaining reactor operation at 5000 KW capacity.

A feature of President Eisenhower's "Atoms for Peace" program, the reactor will utilize B&W-fabricated fuel elements containing 20 per cent enriched uranium-235. This is the usual maximum concentration permitted for shipment abroad under terms of the program. The reactor's plate-type fuel elements will

contain fissionable material in the form of a uranium-aluminum alloy, 45 per cent uranium by weight.

Each of the four pools has a special function. One consists of a standard pool with beam ports and thermal column. The second has an exterior chamber for bulk shielding experiments in air. The remaining two are a storage pool for the reactor core, and an experimental pool in which larger than average equipment and specimens may be immersed for irradiation.

Obituaries

On December 2, Silas Cartland, 63, passed away at Swedish Covenant Hospital. Mr. Cartland, who has been a member of Western Society of Engineers since 1948, was a practicing consulting engineer. His interest in the Society, particularly through his active participation in the Society's Civic Committee and his support of the Society's official publication, *Midwest Engineer*, will make his loss keenly felt by his many friends within Western Society.

The sincerest condolences to the Cartland family are expressed by Western Society on behalf of its membership.

Abraham Epstein, 70, died on December 7, 1958. Mr. Epstein was a Life Member of Western Society.

Among the architectural achievements to Mr. Epstein's credit were the design of such well known Chicago landmarks as the International Amphitheater and the Borg Warner Building. He also designed many buildings of a religious nature throughout Chicagoland.

The Society joins with Mr. Epstein's many friends in extending sincere sympathy to his family.

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Naval Supply Center Installs Digital System

The Oakland (Calif.) Naval Supply Center has announced it plans to install the newest and fastest transistorized digital data processing system on the market today, the Philco Transac S-2000.

According to a Navy spokesman, this electronic "brain" can compute an entire payroll for 8,500 people and savings bond deductions for 14,000 people in just 22 minutes.

The Transac S-2000 also can add 10 digits plus 10 digits 60,000 times in one second, read or write information on magnetic tape at the rate of 90,000 characters per second, and print reports at the rate of 900 lines per minute.

Transac data processing systems are manufactured by Philco Corporation's Government and Industrial Division, Philadelphia, Pa.

Rear Admiral R. J. Arnold, Command Officer of the Naval Supply Center, said the new data processing equipment will greatly facilitate the work at the Center, which provides 90 percent of the supply and logistic support to ships and shore stations in the Pacific ocean area. This involves processing over one million orders per year from an inventory of 635,000 different items of stock which have a \$788,000,000 inventory value.

The Philco Transac S-2000 will replace another electronic data processor that has been in use at Oakland since February, 1957. The Transac will handle a wide range of data processing functions such as order control, accounting, stock control and payroll. Not only will accounting procedures be improved through greater accuracy and system

integration, but the new Transac will save the government money.

Since the Transac S-2000 is fully transistorized, it generates very little heat and occupies much less space than a conventional vacuum tube computer. It can be entirely enclosed in an area about 1,000 square feet.

Transac data processors have almost unlimited storage capacity. Stock status records for all 635,000 items of material stored at the Supply Center can be stored on two and three-tenths reels of magnetic tape, 10½ inches in diameter.

Indoctrination seminars and training classes on the Transac S-2000 are now underway at Oakland due to the necessity of preparing machine programs and converting from the present procedures prior to delivery of the new computer.

Explosive Chute

A fast-opening parachute equipped with two separate explosive chargers which fully inflate the chute before the jumper has fallen 13 feet has been developed by the Army, reports *Product Engineering*. When the jumper pulls the ripcord, the first charge fires the packed canopy to the full height of the suspension. The second charge shoots the canopy from the pack, fully opening the chute.

Gasoline Dispenser

One oil company is planning to test a mobile gasoline-dispensing unit offering motorists everything but lubrication and washing facilities, reports *National Petroleum News*. The unit can be used as an additional island during rush hours, as a temporary station while a station is under construction, and as a mobile station for spot use.

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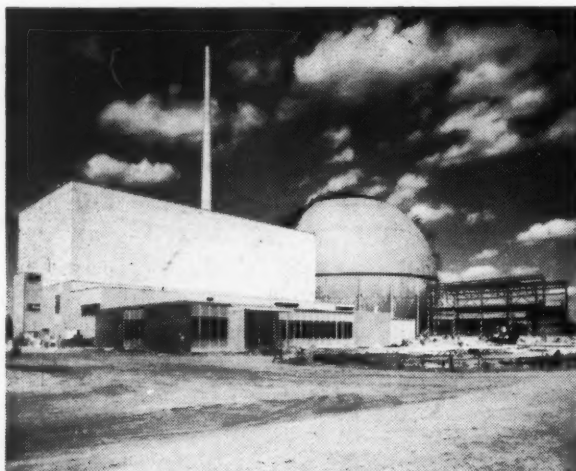
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Dresden Nuclear Power Station 6 Months Ahead of Schedule!

Construction passes halfway mark!

Lights, TV, refrigerators and other electrical appliances in Chicago and Northern Illinois area will draw upon the atom for electricity sooner than expected, according to Commonwealth Edison Company.



Shown above are the Turbine Building and the 190-foot steel sphere which will house the 300-ton reactor. Foundation and framework for atomic Fuel Handling Building can be seen at right.

Work on the Dresden Station—which will have the largest nuclear power reactor in the U. S.—has passed the halfway mark. The plant is expected to be in regular operation six months ahead of the originally scheduled completion date of December 7, 1960.

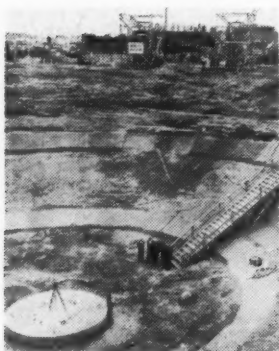
The Dresden plant will provide 180,000 kilowatts of electricity—enough to meet the needs of a city of 250,000.

It is expected that this will be the first full-scale, privately financed atomic plant to go into operation in the U.S. There is no government subsidy.

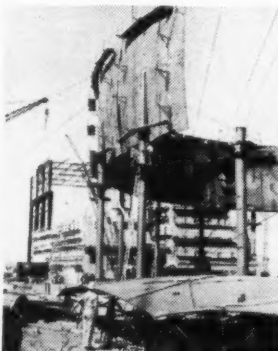
General Electric Company is building the plant for a contract price of \$45,000,000, of which Commonwealth Edison is paying \$30,000,000. The remaining \$15,000,000 is being paid as

a research and development expense by the companies associated in Nuclear Power Group. These are, in addition to Commonwealth Edison, American Electric Power Company, Bechtel Corporation, Central Illinois Light Company, Illinois Power Company, Kansas City Power & Light Company, Pacific Gas and Electric Company, and Union Electric Company.

Delivery of a 300-ton reactor pressure vessel is expected late this year. It is so massive that it must be shipped by water from Camden, New Jersey, where it is being fabricated. It will be routed over the Atlantic and Gulf Intracoastal waterways to New Orleans, and then up the Mississippi and Illinois waterways to the plant.



Major construction at Dresden began in June, 1957. Shown here is excavation for giant 190-foot steel sphere.



By September, 1957, sections of the steel sphere were being welded into position. In the background is the Turbine Building.



In March, 1958, the huge sphere was tested with compressed air to a pressure of 37 pounds per square inch.

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